

Claims:

[c1] (Currently amended) A method for dense and secure transmission of signals and information using a small number of channels, the method comprising

- a) choosing an appropriate integer modulus m , positive integer n , corresponding to the number of bits to be ~~encoding~~ encoded, and generating $n \times n$ matrix A with integer elements where the diagonal elements of A differs modulo m from all the other elements of their column, and where A can be written as matrix-product BC where B is an $n \times t$ matrix, C is a $t \times n$ matrix, where t is less than n ;
- b) encoding the length- n vector x to the length- t vector xB , by vector-matrix product modulo m ;
- c) transmitting the coordinates of the length- t vector xB on t channels;
- d) retrieving the coordinates of the vector by computing $xBC = xA$ by vector-matrix product modulo m ;
- e) for every coordinate of vector $xBC = xA$, filtering out the terms added as the linear combination of other coordinates of vector x .

[c2] (Previously presented) A method according to claim 1, wherein the modulus m is non-prime-power composite positive integer, the diagonal elements of matrix A are non-zero modulo any prime-divisors of m , and each non-diagonal elements of matrix A are zero modulo for at least one prime divisor of m .

[c3] (Currently amended) A method according to claim 2, wherein the filtering step for retrieving the original values of the transmitted 0-1 vector further comprising:

- a) periodical change of the values of the coordinates of vector x with original value equal to 1 on values $0, 1, 2, \dots, m-1$ in this order, and on values of $m-1, m-2, \dots, 3, 2, 1, 0$ in this order of the coordinates of vector x with original value equal to 0;
- b) measuring the periodicity of each coordinates of vector $xBC = xA$;
- c) if a coordinate has period less than m then it is to be neglected;
- d) if a coordinate has period equal to m , and it changes its values as $0, 1, 2, \dots, m-1$, then its original value was 1;
- e) if a coordinate has a period equal to m , and it changes its values as $m-1, m-2, \dots, 3, 2, 1, 0$, then its original value was 0.

[c4] (Previously presented) A method, according to claim 3, wherein the periodic change of the discrete values of the coordinates of vector x are approximated by continuous wave forms of electronic, magnetic or optical signals.

[c5] (Currently amended) A method, according to claim 1, wherein ~~between the communicating nodes~~ two transmission networks are constructed between nodes R_1, R_2, \dots, R_n and S_1, S_2, \dots, S_n ~~two networks are constructed, each node may send or receive a coordinate of a length- n vector~~; in the first network nodes S_1, S_2, \dots, S_n play the role of the senders of coordinates of vector x and R_1, R_2, \dots, R_n play the role of the receivers; they receive the coordinates of $xBC = xA$, and in the second network R_1, R_2, \dots, R_n play the role of the senders of coordinates of vector x , and S_1, S_2, \dots, S_n play the role of the receivers, they receive the coordinates of $xBC = xA$.

[c6] (Currently amended) A method, according to claim 1, wherein the filtering step for retrieving the original values of the transmitted 0-1 vector further comprising:

- a) change of the values of the coordinates of vector x with original value equal to 1 to value 0, and the coordinates of vector x with original value equal to 0 to 1;
- b) measuring the change of each coordinates of vector $x_{BC}=xA$;
- c) if the change in the value of in coordinate i ~~(where integer i is between 1 and n)~~ is not the i th diagonal element of matrix A modulo m or not (-1) -times the i th diagonal element of matrix A modulo m , then the change is neglected;
- d) if the change in the value in coordinate i ~~(where integer i is between 1 and n)~~ is the i th diagonal element of matrix A modulo m then original value was 0;
- e) if the change in the value in coordinate i ~~(where integer i is between 1 and n)~~ is (-1) -times the i th diagonal element of matrix A modulo m then original value was 1.